Enhancing learning in the laboratory: Identifying and promoting best practice in the professional development of demonstrators

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Background

“Any discussion of science education in universities must involve the key role played by demonstrators. Demonstrators were cited as a significant factor in the laboratory experience by most students, often the most significant factor.”

For many students:

- the demonstrators symbolised their interaction with the world of science at an immediate and practical level;
- the lab was a place of significant interaction with a more knowledgeable person who guided them through the complexities of lab work; and
- demonstrators had the power to make a lab a great or a miserable experience.

Aims of the Fellowship

1. To develop a network of academics to run Laboratory Demonstrator Professional Development programs in their home institution/city and champion the demonstrator as critical element in the education of science students.

2. Develop a framework for a "Certificate of Laboratory Demonstrating" to allow demonstrators to collect evidence of their good teaching practice that could be used towards recognition.
Curtin LDPD program

(i) a full day workshop on teaching in laboratories with a focus on the educational issues and student learning,

(ii) use of a demonstrator's preparation template to highlight educational objectives and practical issues and

(iii) weekly group meetings to discuss teaching strategies for individual experiments.
Lab Demonstrators’ Workshop

Interactive discussion based

Models good teaching practice strategies

Workshop program

• Why have labs? What is your role?
• Qualities of good/bad demonstrators
• Student expectations of demonstrators
• Laboratory scenarios
• Assessment strategies and feedback
Lab Demonstrators’ Workshop

Do students learn what we think we’re teaching them?

• Part 1 - Understanding learning and teaching
  - information processing model
  - language and giving instructions
  - Solenol Ditrate video

• Part 2 - A Private Universe video
  - preconceptions/misconceptions
  - deep and surface learning
  - effective questioning
Lab Demonstrators’ Workshop

Participant evaluation of workshops

- Attending this workshop was a worthwhile experience.
- It was pitched at the right level.
- The level of interaction and discussion was appropriate.

- I disagree strongly
- I disagree
- I’m not sure
- I agree
- I agree strongly
Demonstrators’ preparation template

Flipped class for demonstrators

The topic headings are:

• What are the purposes of this lab for students?
• New procedures to be learned by students
• New equipment to be used by students
• Key calculations/equations used in this lab
• Possible questions to probe understanding
• Risk assessment
• Lesson plan (key stage-posts)
• Feedback to the coordinator
Weekly meeting with demonstrators

Agenda:
• Feedback from last week’s lab
• Key points/issues from the prep template
• Focus is on PCK in labs
  - discussion on how to teach key concepts and common difficulties

Meetings build a community of practice; demonstrators share their experiences and provide valuable feedback to the whole group
ASELL student lab evaluation

ASLE surveys (N = 8778) of first year chemistry and physics students at Curtin
Fellowship progress

The LDPD workshop run in six new centres
• ECU - Local Champion: Ruben Phillips
• ADFA - Local Champions: Kate Wilson and David Low
• Deakin - Local Champions: Janine McBurnie, Kieran Lim and Julia Savage
• Monash - Local Champions: Yardenah Brickman, Mary-Rose Carroll and Theo Hughes
• UNSW - Local Champions: Scott Sulway, Ron Haines and Anna Choy
• UWA - Local Champion: Dino Spagnoli
Some other LDPD programs

University of Sydney
University of Adelaide
Flinders University
University of Queensland
University of Tasmania
Griffith University
Others??
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Office of Learning and Teaching
Copies of the workbook and slides used for the full day workshop are available from Mauro Mocerino

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Thank You
Questions?